

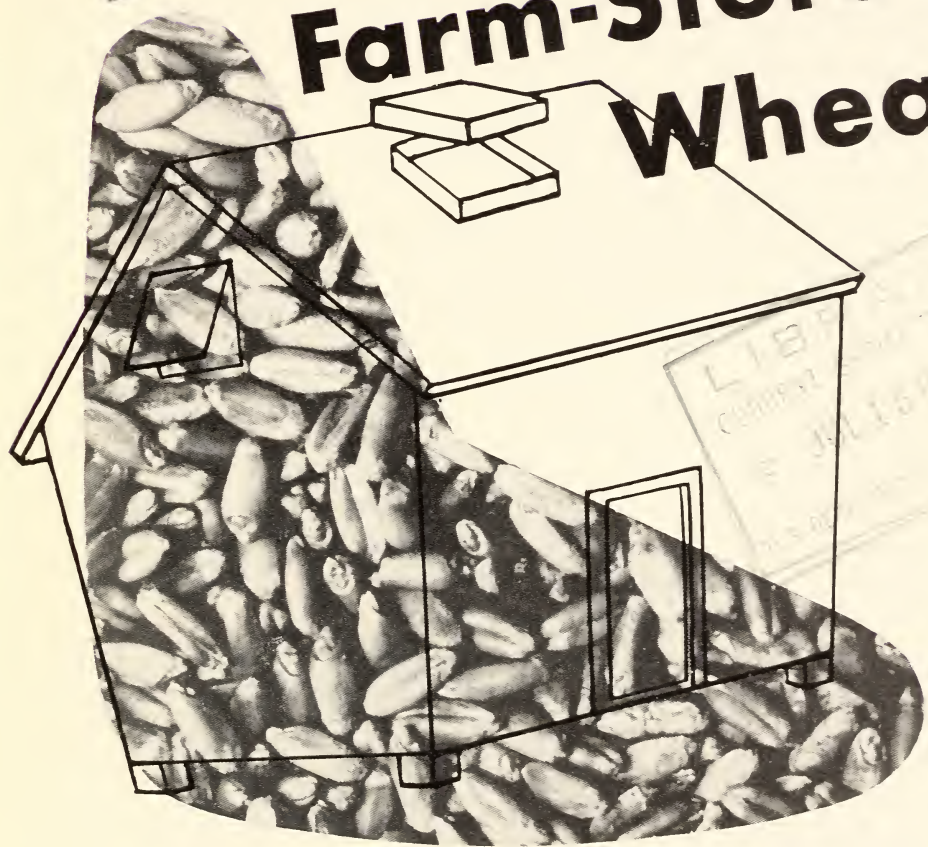
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Insects in Farm-Stored Wheat



How To Control Them

Leaflet No. 345

U. S. DEPARTMENT OF AGRICULTURE

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Insects in Farm-Stored Wheat • HOW TO CONTROL THEM

Wheat in a bin is like money in a vault . . .

Are you protecting your cash from insects?

If you have wheat in storage on your farm, make sure the bin is what it should be—a place where the wheat is protected and preserved. Don't let it be a place where weevils, grain borers, and other granary pests eat away the wheat—and your income.

Insects in farm-stored wheat cost American farmers millions of dollars every year. The loss is preventable. It is waste. It hits the farmer in two ways:

First, some of the wheat is destroyed by the insects.

Second, some of it is made unfit for human consumption. Infested wheat may bring only feed-grain prices at the elevator. Weevil-infested grain is not accepted by millers for processing into flour, cereal, and other food products.

Wheat seldom contains insects when it comes from the harvest field. The job is to keep it free of insects when it is stored. Do these things:

1. Before storing the wheat, get rid of insects living in the bin or near it. Clean up. Use an insecticide.
2. Keep the wheat dry. Make the bin tight.
3. Protect the wheat. Apply a protective powder or a fumigant.
4. Inspect the wheat regularly. Watch for insect buildup. Fumigate if necessary.

Let's find out more about each of these points . . .

A CLEAN START

Keeping insects out of wheat after it is stored is enough of a task. Don't make it harder by putting wheat into a bin where insects are waiting for it. Give yourself a fair start. That means a *clean* start.

Remove leftovers of old grain from the bin, sweep down the walls, sweep the floor. On the surface at least the bin is now free of insects.

See what other places you can clean up to prevent insects from infesting the new wheat. Clear trash and litter from the bin area. Insects live from season to season around farm buildings in spilled grain, in feed, and in bits of grain left in wagons and machinery. Cleaning up these places helps control not only insects but also rats and mice.

Insects may be living in cracks in the walls and floor of the bin, where your

cleanup can't reach. Destroy them with an insecticide.

Prepare a spray containing 2.5 percent of DDT, methoxychlor, or TDE—or 0.5 percent of pyrethrins or allethrin.

Buy one of these insecticides in the form of a wettable powder or emulsifiable concentrate and mix it with water. The label will tell you how much to mix with water in order to get a spray containing the desired percentage of insecticide.

Apply the spray to all surfaces inside the bin. Apply it at the rate of 2 gallons to 1,000 square feet. Use a garden sprayer or a power sprayer.

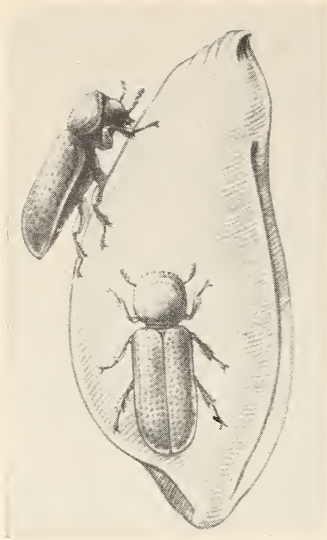
Sprays containing pyrethrins or allethrin in combination with a synergist (a chemical that increases the effectiveness of the insecticide) are available. The rate at which they must be applied



Sweep down the walls.



Sweep the floor.



Adults of the lesser grain borer.



Adult of the rice weevil.

to make them the equivalent of a 0.5-percent emulsion of pyrethrins or allethrin applied at the rate of 2 gallons to

1,000 square feet has not been determined. If you use one of them, follow the manufacturer's recommendations.

DRY STORAGE

Granary pests like moisture with their grain. The less moisture stored wheat contains, the less attractive it is to insects.

Try to store the wheat when it is dry. If for some reason you have to store wheat with high moisture content, check frequently to see whether insects are developing in it. The more moisture there is, the closer you have to keep watch.

Once the wheat is stored, keep it dry. To do this, you must have a tight, weatherproof bin.

How about the roof and side walls? Will they keep out rain and snow?

Can ground water and moisture get through the foundation and floor?

Will doors and windows keep out driving rain?

Does your bin have adequate ventilation?

Besides keeping out bad weather, tight construction keeps out rats, mice, and birds. If fumigation of the bin becomes necessary, tight construction makes that job easier and more effective.

CHEMICAL PROTECTION

When you are satisfied that the bin will keep the wheat dry, and that insects in it and near it have been destroyed, there is a further step that you can take to ward off insect infestation.

Apply a protective powder to the wheat before it is stored or as it goes into the bin. Or fumigate the wheat after it is in the bin. The materials are sold where other agricultural chemicals are sold.

PROTECTIVE POWDER

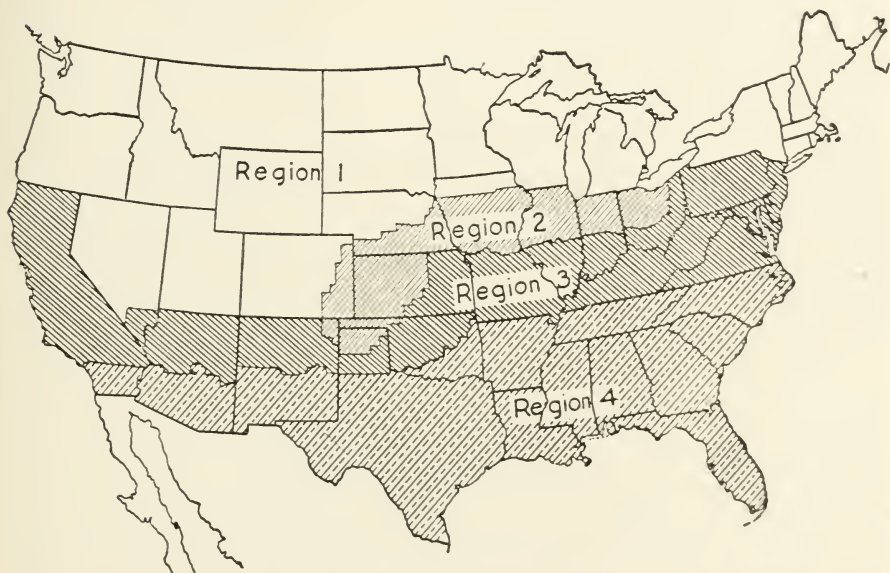
Powder for protecting wheat is sold under a trade name. It contains 0.08 percent of pyrethrins and 1.1 percent

of piperonyl butoxide (a synergist). The rest of the product consists of an inert carrier for the chemicals.

The powder is most useful in regions 2, 3, and 4 (see map). Applied to newly harvested wheat at the time of binning, it gives protection against insect infestation during the first storage season.

There are two ways of applying it. You can spread it over the surface of a truckload or wagonload of wheat. As the wheat is elevated or shoveled into storage, the powder becomes mixed with it.

The other way is to use an automatic applicator, which feeds powder directly



The map shows, by regions, the degree to which farm-stored grain in the United States is subject to insect attack: Region 1, little if any damage occurs to wheat stored on the farm during the first season. Region 2, insects are troublesome during the first season in some years. Region 3, insects are troublesome every year. Region 4, insect control is especially difficult.

into the wheat stream as the wheat is elevated.

Follow the dosage recommendations of the manufacturer.

FUMIGANTS

Kinds and Dosages

Fumigants are sold under various trade names. The ingredients are shown on the labels. The label on the fumigant you buy will probably show that it is one of those listed in the table on page 7.

The table shows the ingredients in some readily available fumigants, and the recommended dosage for each fumigant.

Several other suitable fumigants are available. If you use one not on the list given here, follow the manufacturer's dosage recommendations.

How To Fumigate

First, level the surface of the wheat in the bin.

Then apply the fumigant as a coarse spray over the surface. Apply it evenly.

CAUTION.—Always apply the fumigant from *outside* the bin. Avoid inhaling the vapor. Avoid spilling the fumigant on the skin or clothing. If



Applying fumigant to farm-stored wheat with a hand sprayer.

Fumigant	Gallons per 1,000 bushels	
	Wheat stored in a wooden bin	Wheat stored in a metal or concrete bin
Carbon tetrachloride (100%).....	6	3
Carbon tetrachloride-carbon disulfide (80%-20%).....	4	2
Ethylene dichloride-carbon tetrachloride (75%-25%).....	6	3
Carbon tetrachloride-ethylene dichloride-ethylene dibromide (60%-35%-5%).....	4	2

you get fumigant on your clothes, take them off immediately to prevent personal injury.

Small quantities of stored wheat can be fumigated quickly and effectively by applying the fumigant with a garden sprayer or a bucket-pump sprayer. If you use a garden sprayer—

Enlarge the opening in the spray disk to the diameter of an eight-penny nail; *or*

Remove the spray nozzle and substitute a nozzle made of a pipe $\frac{1}{4}$ inch in diameter and 6 inches long; flatten the spray end.

To fumigate a large quantity of

wheat, use a power spray pump that will take the fumigant directly from the container in which it is purchased.

All pump fittings should be of bronze, which resists the corrosive action of fumigants. Hoses and gaskets should be of plastic or synthetic rubber.

When To Fumigate

Fumigate within 2 weeks after binning the wheat if you live in region 4, and within 6 weeks if you live in region 2 or 3. If you live in region 1, fumigate when necessary to prevent insect buildup.

REGULAR INSPECTION

About every 30 days take standard probe samples from the center of the bin and inspect them for insects.

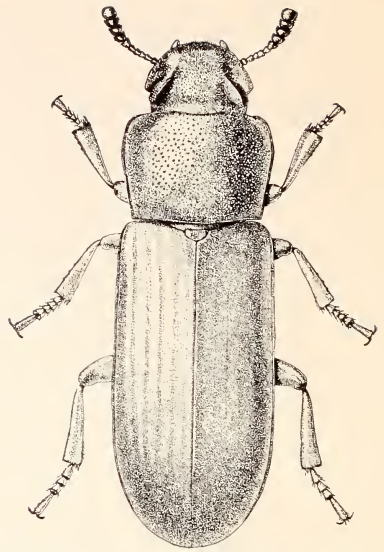
Sift the sample through a 10- to 12-

mesh screen. The screen will hold back the wheat, but insects will sift through.

Fumigate at once if you find even



Adult of the saw-toothed grain beetle.



Adult of the confused flour beetle.

one granary weevil, rice weevil, or lesser grain borer per quart sample of wheat, or as many as five insects of other kinds (such as flour and grain beetles, cadelles, or grain moths) per quart sample. The fumigation proce-

dures is the same as that described on pages 6 and 7.

After applying the fumigant evenly over the entire surface, give an extra treatment to any areas where insects are especially numerous.

Fight Your Insect Enemies

THIS LEAFLET was prepared by the Division of Stored Product Insect Investigations, Bureau of Entomology and Plant Quarantine, Agricultural Research Administration, United States Department of Agriculture.

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